THE EFFECT OF USING BLENDED LEARNING STRATEGY ON ACHIEVEMENT AND ATTITUDES IN TEACHING SCIENCE AMONG 9TH GRADE STUDENTS

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Abstract

The aim of this study represented by identifying the impact of teaching science using blended learning strategy in the development of achievement skill among students. The study focused on the students in the ninth grade in Dubai Educational zone in the first semester of the year 2013/2014. Sample has been selected from Omar Bin Al-Khattab intermediate School (45) students. The school has been chosen as it provided a computer lab, e-learning equipment and tools to accommodate the number of students. A subject has been designed from the first unit in science to the ninth grade and it was followed by an achievement test which consists of a multiple choice study before and after applying the educational program. Along with these tests, a questionnaire was prepared in order to measure student's attitudes. To justify our calculation, the results were manipulated by analysis of covariance (ANCOVA) along with analysis of variance (ANOVA). These calculations conclude our finding to the following: the results and its analysis show that the two groups, one of them under traditional teaching method and the other using blended learning strategy. Using blended learning strategy to teach science, has a positive impact in achievement skill and attitudes. The study showed high level of performance on achievement test as a whole after applying blended learning strategy. At the end of this study, many issues required more researcher's attention, so, in the light of these findings, we provide recommendations in various areas.

Keywords: Teaching strategies, e-learning, blended Learning strategy, achievement, Attitudes

Introduction

The major issue that faces educators anywhere represented by how they can provide a better and interactive educational environment and which

method can lead them to their aim. The traditional method "using book", has a limited effect on students. we can't increase it compare with the using computer technology which uses pictures, storing the information, simulation and immediate evaluation, moreover, using computer as an educational method provides an interactive environment.Using computers as an educational method or necessary tool started since 1977 due to the development of the computers and digital multimedia(Vaughan, 2007).

The educators prefer to involve computer in education because they believe that using it will be an advantage due to the fact that the computer is more effective as an educational method compared with other tools. Computer provides students with chance to educate themselves, assist those who have learning difficulties in attractive ways. Due to the rapid increase in using technologies in different fields in our life and introducing new educational ways such as e-learning, e-school and virtual class, all these factors make sense of considering that technology should be a major partner and effective educational tool. The traditional educational system considers a teacher as a main player and the whole learning operation depends completely on the teacher. But, in the blended learning, teachers represent one of the tools that provided by the educational corporation, example for by Ministry of Education this plan, they adopted the use of computerized subjects that considered student as a partner in the educational operation. The main feature of blended learning, is making the whole operation depends on student's interaction with computer and help them to be more creative and positive, and the teacher's role is to control the work flow of the computerized subjects (Osguthrape and Graham,2003).

Generally, blended learning aims to employee multi-educational methods to achieve the final goal behind education (Tsoi, 2009).The uniqueness of the blended learning is represented by its ability to use the refined techniques from both, e-learning and traditional method, thus, the output will be a version of the best from each method. As a result of this revolution in the methods and techniques of education, which provided the means to help provide scientific material to students in an easy, fast and clear, originated various forms of e-learning, to suit the needs of learners and the nature of the tools available to connect to including education depends on the use of electronic media lessons in the classroom, and communication between teachers and learners, and receive information, and the interaction between the student and the teacher and the student and the sources of information available in the school.

Problem of the Study
According to the investigator's experiences as a science teacher over three years along with the actual practice and exchange of visits between

colleagues disinclination of students to science classes that depend on traditional methods in providing ideas and scientific concepts. Also, the science classes by using computerized materials such as power-point, this method is helpless because the students were just listening and watching. Most of the public schools results indicate that the achievement tests in science declining. Thus, the integration of traditional learning and e-learning is an urgent requirement to achieve returns of the learning process, and blended learning.

The aim of the study

The aim of this study is to identify the impact of teaching science using blended learning strategy in achievement and attitudes.

Research questions

This study has the following major questions that lead to identify the impact of teaching science using blended learning strategy in achievement :

1. What is the effect of using blended learning strategy on achievement in teaching science among 9th grade students?
2. What is the effect of using blended learning strategy on attitudes in teaching science among 9th grade students?

The significant of the study

The importance of this study due to the following:

1. The scarcity of educational researches that deal with the similar problems
2. This study helps to find strategies and specialized educational programs for achievement substitute for traditional methods common in teaching.
3. The results of the study can be used in the development of training programs in the development of methods and techniques and strategies pursued by the science teachers.
4. This study also provides a modest addition to the literature of education in the field of teaching science and encourages teachers of science to employ blended learning in the educational process which reflects on increasing the effectiveness of education quality.

Literature review
Definition

Blended learning: blended learning represents an educational method that converts the curriculum into a computerized topics and multimedia such as image and sounds to make the educational process more effective and valuable.

Since the end of the last century the first wave of e-learning was started and it focused on the introducing advanced technology in the educational process, and convert classrooms into virtual classes. There's strong relation between e-learning and blended learning, the different represented by the following: the blended learning uses a combination from e-learning and traditional learning.

Previous studies

Different studies in educational field that have directly or indirect relation to the present study, the following represent a brief summary for the most important researches: Rothman study (2000) aimed to identify the impact of the computerized book compared with the traditional one on the specific outputs. the sample (209) students in the fifth grade, enrolled in three schools in the area of semi-civilized, were divided into three groups and treated each group one of the following areas: teaching using blended learning, teaching using non-traditional method that depend on computerized subject only and traditional teaching based on the book only as a basis for teaching. The results showthat both teaching using non-traditional and blended learning method impact positively and improves of the critical thinking skills.

Bailey study (2003) aimed to investigate the effects of learning strategies on the interaction of the student with the student, and the interaction of the student with the teacher and it measure student satisfaction. Theparticipants of this study were (84) and they're student at the State University ofBin Slvanaawhere they divided into two divisions, one taught according to the strategies of blended learning, and the other based on other strategies. The results showed no differences in the level of student satisfaction, but, it show that using blended learning strategy has positive effects to increase awareness of the student to student-student interaction.

In Maguire study (2005), the main point is to investigate the effect of blended learning method in the student's achievement in mathematic. The study sample represented by intermediate school in Toronto area in Canada, where the study was conducted on 56 teachers who are using blended learning as a method to teach mathematics. According tothe results, the blended learning method helps students to perform and score better than the others.

In study Toth&Ludvico, (2009)aimed to identify the effect of the experiences gained by blended learning to the development of mental and visual skills. The study results indicated that the educational experiences of educational method blended learning lead to the acquisition of skills, mental and visual such as reading data, calculations, and interpretation of results, report writing, and pointed out that the knowledge gained was satisfactory.

Simpson and Anderson (2009) aimed to know the effect of teaching and blended learning to the level of knowledge and motivation among the students of the ninth in Science in Germany. Theresults indicated that the strategy of teaching and blended learning led to improved educational outcomes of the experimental group and in particular cognitive processes with the upper levels. The study found that the strategy of teaching and blended learning led to increased interests and inclinations of students, and the results indicated a strong correlation between interest and internal motivation and cognitive learning outcomes.

Mendez and Gonzalez (2010) Assess using blended learning in other fields such as engineering, In their paper, the inclusion of a reactive element--a Fuzzy Logic based controller is proposed for a blended learning approach in an introductory control engineering course. This controller has been designed in order to regulate the workload for each student, according to his activity and performance. The proposed course is based on a web tool called ControlWeb, which includes a complete vision of control topics and is used intensively along the course. The results of the evaluation of the methodology attest its efficiency in terms of learning degree and performance of the students.

Mofeed and Al-Sous (2010) aimed in their study to identifying the effect of utilizing blended learning strategy on the ability of teachers in designing and producing educational multimedia. This study is a descriptive one. It mainly describes the features of the training program and determines the percentages of blended between different models of learning. The subjects of the study consisted of (120) teachers and technology specialists. The results reveal that the teachers were able to design and produce educational multimedia, which makes them more confident in dealing with e-learning and create their own model of blended learning.

Research Methodology and procedures
- **Study Subjects**

The sample size is (45) students from two groups serving two lines:
- Group gets the treatment or program
- Group is the comparison group and doesn't get the program
- **Tools**
    - **The educational program:** this program has been set up tutorials to some topics from science book grade nine. These tutorials designed in a multiple effects such as images, sounds, video clips, sound effects and text together which guide to attract students and clarify the concepts, meanings of the subject.

o **Achievement test**

The test has been prepared and it includes (20) multiple-choice paragraphs, the maximum mark of the test (50) and the test time 45 minutes. The test was conducted after the completion of the teaching of educational material directly and it used to measure the level of the two groups and their previous knowledge.

    o achievement test validity: Been confirmed through revision and comments of (10) doctorate and master's degree holders in curriculum and methods of teaching science and technology education, their opinions and propose represented the views of arbitrators delete some paragraphs and add other paragraphs and modify some of the questions.

    o Achievement test reliability: Been confirmed using (test-retest)method where the test on a sample from outside the sample of the study and number of the application (15) students from ninth-grade students and two weeks after giving the test was re-applied to the same sample, were calculated Pearson correlation coefficient between the two applications, where total reliability coefficient (0.89) was considered suitable for the purposes of this study value.

o **Questionnaire**

The questionnaire has been prepared to record the responses of the sample and it consisted of 29 items distributed on three areas: learner,Article(content) and The teacher and the teaching method. the validity of the content of the questionnaire Verified through a number of arbitrators specialists, in addition to this was reliability of the questionnaire calculated using internal consistency coefficient (Cronbach's alpha) and found that (0.81), a reliability coefficient refers to rely on the tool for research purposes, and for the coefficient of consistency internal each area were as, follows:

- The learner was (0.64)
- The content was (0.72)
- Theteacher and the teaching method was (0.62)

o **Variables of the study**

- Independent variables:
  - Blendedlearning strategy
  - The traditional teaching way.
- Dependent variables: student performance on the multiple choice test and direct collection to ninth

grade students in basic science and measured the total marks obtained by the student in the test prepared for this purpose.

o **Statistical treatments**

All the data and results were analyzed using software (SPSS) which provides statistical methods and descriptive such as averages, standard deviations, and statistical methods appropriate analytical included analysis of covariance (ANCOVA) and analysis of variance (ANOVA). The aim behind these methods is to detect the effect of teaching science using blended learning strategyin achievement among students in ninth grade compared to the effect of the traditional teaching method in the Dubai Educational Zone.

Results and interpretation

To find out whether there are statistically significant differences at the level (0.05) for the effect of teaching science using blended learning strategy in the development of skill achievement among ninth grade students compared to the usual way at the Dubai Educational Zone, we start with calculating means and standard deviations for the performance in acheviement test of the study subjects according to group as in table (1).

Table (1) Mean and Standard deviation the study subjects for the performance in acheviement test by group

Group	standarddeviation	Mean
G1	29.7	50.90
G2	14.6	38.58
n	24.7	45.30

According to table (1), the mean of the experimental group is (50.90) with standard deviation (29.7) and the mean of the control group (38.58) with a standard deviation (14.6). these differences between means were tested as in table(2).

Table (2)Analysis of covirance (ANCOVA) for differences between groups means

Source	Sig. level	P value calculated	Mean square	Df	Sum square
Pre-test	0.355	0.1064657	462.619	1	462.619
Group	*0.005	8.1077857	4345.238	1	4345.238
Error			535.934	42	56808.952
Total				44	66815.100

* Statistically significant at α = 0.05

Table (2) show the lack of statistically significant differences attributable to the variable pre-test, and this can be explained that the

students surveyed when responded to pre-test were not having any training used blended learning strategy. Therefore, the study group experimental and control grouphave the same mental capability and educational level before they undergo training and teaching-blended learning strategy. Also, it is clear from table (2) there are statistically significant differences between the study groups in favor of the experimental group which studied using blended learningstrategy. This result, the mean (50.90) and the standard deviation was (29.7) indicate that blended learning strategy has an effect in achievement. Moreover, the result shows that the new teaching strategy has led to increasethe student's interaction and understanding of the content and material, which contributed to an increase in achievement and the existence of an impact on the teaching method.

There may be another reason behind this result, using blended learning strategy caused of the development of communication skills, verbal as they focus on direct interaction in the classroom through the use of modern communication mechanisms.Blended learning strategy helps students to organize their information, attitudes and educational experiences that provide the learner through multimedia offered by modern technology or information technology. The main issue here blended learning represents type of education that delivers the information in short time, effort and cost, also, we can be able to manage the educational process and tuned, and measuring and evaluating the performance of learners. Moreover, blended learning strategy raise motivation and break the deadlock by providing an equal opportunity for all, and to improve and raise the level of achievement of learners, and taking into account individual differences among learners and special needs.

Table (3)Mean and standard deviation the study subjects performance on questionnire on (learner)domain

Group	standarddeviation	Mean
G1	0.32	4.43
G2	0.41	4.39
n	0.35	4.39

The data in table (3) show that the mean of the experimental group that studied the strategy of blended learning is (4.43) with a standard deviation (0.32), and the meanof the control group (4.39) with a standard deviation (0.41).

To identify whether there was a statistically significant difference between the average responses of experimental and control groups on the first domain "learner", ANOVA used and results shown in table (4):

Table (4) Analysis of virance (ANOVA) for differences between groups means (learner)

Source	Sig. level	P value calculated	Mean square	df	Sum square
Group	0.668	0.205	0.046	1	0.092
Error			0.224	43	9.411
Total				44	11.013

According to the evident from table (4), the calculated p-value (0.205), and the significant level is (0.668) which indicates that there is no statistically significant differences attributable to the group on the first domain "learner", furthermore, the test review common issues that concern to all such as the role of science to understand the scientific aspects and natural, and its importance in daily life. Moreover, the values which provided by science reflect on the student's personality and development of mental abilities through creative thinking and heritage, in addition to the fun during learning science.

These findings are consistent with several studies such as Mendez and Gonzalez (2010) in terms of a statistically significant difference in students' attitudes towards the strategy used and favors of the experimental group, also, the presence of an impact statistically significant of blended learning in student's achievement and in their attitudes .To find out whether there are statistically significant differences at ($\alpha = 0.05$) attitudes in the ninth grade students the basic Dubai Educational Zone are attributed to material science, Dubai Educational Zone on the field of "content" was calculated averages and standard deviations for the performance of the study sample according to their attitudes about the article. As in Table (5)

Table (5) Mean and standard deviation the study subjects performance on questionnire on domain (content)

Group	standarddeviation	Mean
G1	0.59	3.35
G2	0.47	3.36
n	0.56	3.28

Table(5) shows that the meanof the experimental group that studied the strategy of blended learning is (3.35) with a standard deviation (0.59), and themeanof the control group (3.36) with a standard deviation (0.47). And to indicate whether there is a statistically significant difference between the average responses of experimental and control group on the (content), has been used analysis of variance (ANOVA), and table (6) illustrates this.

141

Table (6) Analysis of virance (ANOVA) for differences between groups means (content)

Source	Sig. level	P value calculated	Mean square	df	Sum square
Group	0.097	2.397	0.446	1	0.893
Error			0.186	43	15.439
Total				44	27.977

The main value will be effective represented by p-value, according to table (6), the calculated p-value (2.397), and tolerable (0.097). this finding indicates that there is no statistically significant differences attributable to the group on the second area (content), and perhaps the reason behind this represented by its ability to develop a sense of scientific thinking and the nature of things in a scientific way and solve scientific problems in based on sequential and logical.

To find out whether there are statistically significant differences at (α = 0.05) and focus on the variable "the teacher and the teaching method", we calculate averages and standard deviations for the performance of the study sample according to their attitudes toward the material as in table (7).

Table (7) Mean and standard deviation the study subjects performance on questionnire on domain (method)

Group	standarddeviation	Mean
G1	0.50	3.99
G2	0.48	3.58
n	0.49	3.80

Reviewing the data in table (7), we come to know that the mean and standard deviation of the experimental group that under blended learning strategy are (3.99) and (0.50) respectively, while the meanof the control group (3.58) with a standard deviation (0.48).And to indicate whether there is a statistically significant difference between the average responses of experimental and control groups on the second area (the teacher and the teaching method), was used analysis of variance, and the table (8) illustrates this .

Table (8) Analysis of virance (ANOVA) for differences between groups means(method)

Source	Sig. level	P value calculated	Mean square	df	Sum square
Group	0.002 *	6.637	1.281	1	2.563
Error			0.193	43	16.016
Total				44	21.400

* Statistically significant at the significance level α = 0.05

According to the evident from table (8), the value of (P) calculated (6.637), and tolerable (0.002), and this indicates the presence of statistically significant differences attributable to the group on the third area (the teacher and the teaching method) which mean the students who learn using

traditional way scoring lower than the students who learn by blended learning strategy. This finding can interpreted as follow; blended learning strategycreating an effective environment for the development of communication skills which reflect on student's skills such as the activities and attitudes of natural life, increasing their interaction with these attitudes. Inaddition to, students were passing experience during the learning process because of the use of various electronic media multi-throwing lessons in the classroom, communication between teachers and learners, receive information, and the interaction between the student and the teacher.Theimportance of blended learning strategy comes from the student feeling towards this method, they feel that they play a major role during learning and because they have the option to choose which method of learning suit to them. Blended learning strategy saves the time for both the teacher and the student. These findings also, consist with Mendez and Gonzalez (2010) study in terms of a saves time for both the teacher and the student.

Conclusion

Blended learning represents an effective method in teaching science, and it reflects positively in the student's performance in the specific subject. This method take it's important due to the use of both, the e-learning and traditional method and as a result of this, the student's achievement in science and their skills were improved. The use of blended learning strategy plays a major role of turning the educational environment to a creative and interactive; it involves the learners and the teacher in the education process. The teacher and the learner, both of them represent a major part of blended learning strategy, thus, the class and subject turn into a fun and attractive. In addition, the interaction between the learner and the learning materials in the electronic environment without the need for the presence of the teacher develop the skill of self-learning, in other words allows the transition from education to learning and concentration on the teacher to be concentrated on the learner and thereby improve the quality of the learning process education as a whole. Finally, using blended learning strategy as a teaching method, reflect on raising student achievement and improving their attitudes towards learning. Moreover, it develops student's skills, including: communication skills, receive information, and the interaction between the student and the teacher, the student feeling towards this method, they feel that they play a major role during learning and because they have the option to choose which method of learning suit to them. Blended learning strategy saves the time for both the teacher and the student.

Recommendations

In light of the results of this study, I recommend the following for further research and development: Blended learning should be involved in other subjects due to the effects in teaching science. The researchers should conducts further studies on the use of blended learning strategy in student achievement in other education's areas and consider other variables such as sex, student's score rate, and student's experience in the field of the IT and internet. Also, there are many issues that affect blended learning strategy from the perspective of students and teachers and their attitudes towards it, thus, more studies should be focus on this area to improve the use of this method. This study should be the gate for other similar studies to show the impact of using blended learning strategy in other scientific materials or other levels of education.

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